

EASY INSTRUCTIONS
FOR OPERATING THE

CONTROLLED-KEY

COMPTOMETER

REG. U. S. PAT. OFF.

COMPTOMETER DIVISION

FELT AND TARRANT MFG. CO.

1735 NORTH PAULINA ST.

CHICAGO 22, ILLINOIS

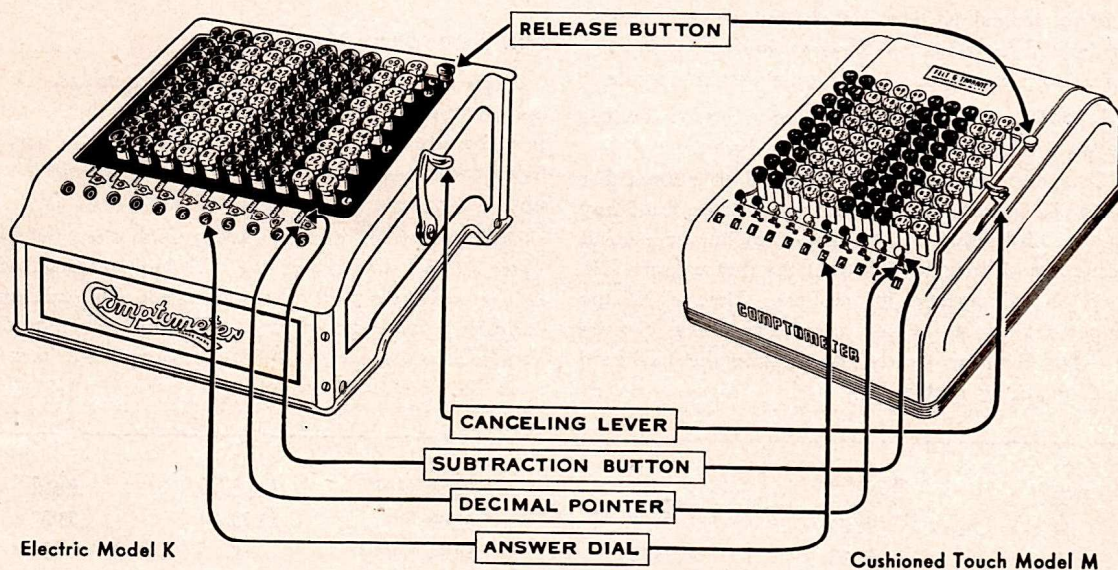
DECIMAL EQUIVALENTS OF COMMON FRACTIONS

4THS		6THS		8THS		12THS		16THS	
1	.25	1	.1667	1	.125	1	.0833	1	.0625
2	.5	2	.3333	2	.25	2	.1667	2	.125
3	.75	3	.5	3	.375	3	.25	3	.1875
		4	.6667	4	.5	4	.3333	4	.25
		5	.8333	5	.625	5	.4167	5	.3125
				6	.75	6	.5	6	.375
				7	.875	7	.5833	7	.4375
						8	.6667	8	.5
						9	.75	9	.5625
64THS						10	.8333	10	.625
						11	.9167	11	.6875
1	.0156	22	.3438	43	.6719			12	.75
2	.0313	23	.3594	44	.6875			13	.8125
3	.0469	24	.375	45	.7031			14	.875
4	.0625	25	.3906	46	.7188			15	.9375
5	.0781	26	.4063	47	.7344	32NDS			
6	.0938	27	.4219	48	.75				
7	.1094	28	.4375	49	.7656	1	.03125	17	.53125
8	.125	29	.4531	50	.7813	2	.0625	18	.5625
9	.1406	30	.4688	51	.7969	3	.09375	19	.59375
10	.1563	31	.4844	52	.8125	4	.125	20	.625
11	.1719	32	.5	53	.8281	5	.15625	21	.65625
12	.1875	33	.5156	54	.8438	6	.1875	22	.6875
13	.2031	34	.5313	55	.8594	7	.21875	23	.71875
14	.2188	35	.5469	56	.875	8	.25	24	.75
15	.2344	36	.5625	57	.8906	9	.28125	25	.78125
16	.25	37	.5781	58	.9063	10	.3125	26	.8125
17	.2656	38	.5938	59	.9219	11	.34375	27	.84375
18	.2813	39	.6094	60	.9375	12	.375	28	.875
19	.2969	40	.625	61	.9531	13	.40625	29	.90625
20	.3125	41	.6406	62	.9688	14	.4375	30	.9375
21	.3281	42	.6563	63	.9844	15	.46875	31	.96875
						16	.5		

INTRODUCTION

THE COMPTOMETER is a key-driven adding and calculating machine which performs quickly and easily all forms of arithmetical figuring involving addition, multiplication, division, and subtraction.

each key top is a large and small figure. The large figures are used for addition and multiplication; the small figures for division and subtraction. The answer dials show the result of the calculation. The lever at the right, called the canceling lever, clears



Method of operation is the same for Models J, K, and M.

Operation is exceedingly simple—no operating lever to pull, no crank to turn, no preliminary setting of dials. Nothing to do but press the keys and read the answer—the machine does the rest.

The keyboard is arranged in eight or more columns* of nine keys each, which are grouped in alternating sections, colored green and white. On

the answer dials. The pointers above the answer dials are used to point off decimals. The cut-offs or buttons at the left of each column are used for subtraction. The red release key at the upper right-hand corner unlocks the keyboard after an incomplete key stroke error has been corrected. See page 5 for proper use of controlled-key.

*The Comptometer is manufactured in three standard sizes: 8, 10, and 12-columns. A 20-column Comptometer is also manufactured for use in heavy statistical and distribution work.

ADDITION

General Instructions

THE two columns of white keys on the right side of the keyboard are for adding units and tens of cents. The next three columns of green keys are for adding units, tens, and hundreds of dollars. The adjoining three columns of white keys are for adding thousands, tens of thousands, and hundreds of thousands, amounts. Keys farther to the left are for adding correspondingly higher denominations.

In addition always use the large figures on the keys.

Only one key should be operated at a time. For example, in adding \$3.45, first press down the 3 key in the third column, then the 4 key in the second column and then the 5 key in the first column. No keys are depressed for ciphers. Always lift the finger slightly off the key after each stroke. For the first few days go slowly, memorizing the keyboard and acquiring rhythm.

Remember to place the finger on the key desired and press it down until you feel it strike bottom. This push-stroke requires practice. It differs distinctly from the sharp staccato blow of the typewriter. It is the easiest known stroke on the finger. It eliminates the impact of striking the key.

Full Keyboard Method

Below are six columns of figures to be added. Use only the index and second finger. The index finger is to be used for all figures except the right-hand figure which should be added with the second finger.

Use the full keyboard, adding each item across from left to right. If you find the keyboard locked it is a positive signal of misoperation. The rule for correcting operating errors is explained on page 5. For the first few days go slowly. Speed will come later. Depress only one key at a time.

<u>No. 1</u>	<u>No. 2</u>	<u>No. 3</u>	<u>No. 4</u>	<u>No. 5</u>	<u>No. 6</u>
41.79	91.59	79.27	42.67	21.25	96.57
18.57	78.25	65.76	58.14	15.96	5.82
21.45	451.35	413.45	87.00	43.21	68.42
4.67	6.47	135.00	45.50	87.65	102.19
432.35	5.60	223.57	235.00	1.92	79.18
14.46	12.35	86.40	57.68	218.19	517.29
5.38	38.00	240.00	68.77	93.15	61.48
432.25	913.50	33.46	433.24	37.92	43.27
165.70	42.34	5.67	700.00	479.99	197.52
540.62	78.16	41.71	307.20	45.55	37.25

Add each column and write the total obtained. Then prove at once by re-adding the column. For practice add each column at least four times. If

an error is made it is usually the result of trying to go too fast.

TOUCH METHOD

TOUCH method of addition provides the greatest degree of speed and accuracy and is simple and easy to learn. Touch method is highly recommended, because it eliminates time spent in looking from the work to the keyboard. Only the lower half of the keyboard is used in touch addition; all keys are within easy reach of the fingers.

To add 6, strike 3 twice

To add 7, strike 3 and 4

To add 8, strike 4 twice

To add 9, strike 4 and 5

Upon examining the keys it will be noticed that the odd-numbered keys: 1, 3, 5, etc., are concave. The even keys: 2, 4, etc., are flat-topped. This is to facilitate touch operation.

With this in mind add the following examples.

Begin at the top of each column and add down. Use the first finger for adding in the tens column only and the second finger for adding the units column only. Keep each finger on its own column. Find the keys by sense of touch, as much as possible.

In adding it is necessary to acquire a smooth rhythmic stroke. Hold a pencil between the thumb and palm of the operating hand. This helps to balance the hand and the pencil is always in readiness for writing down answers.

A Comptometer improperly placed is detrimental to speed and ease of operation. It should be placed at right angles or slightly to the right of the operator with the left edge in a direct line with the center of the body. The desk and the seat of the chair should be of a height to permit the feet to touch the floor and the fingers to rest comfortably on the keys.

<u>No. 1</u>	<u>No. 2</u>	<u>No. 3</u>	<u>No. 4</u>	<u>No. 5</u>	<u>No. 6</u>	<u>No. 7</u>
22	33	43	23	67	84	25
23	34	33	36	43	47	92
33	43	12	43	77	63	14
34	32	54	48	65	84	52
44	31	23	35	95	93	71
45	35	32	49	48	32	42
55	53	24	43	64	26	35
54	25	25	36	23	82	92
43	24	35	42	72	48	25
<u>353</u>	<u>310</u>	<u>281</u>	<u>355</u>	<u>554</u>	<u>559</u>	<u>448</u>

Add each column and compare the total obtained with that shown at foot of column. For practice add

each column at least four times. Practice for a full rhythmic stroke. Speed will come with practice.

TOUCH METHOD

Adding Whole Numbers and Dollars and Cents

TO ADD the following three and four-figure items use the index finger for all figures except the extreme right-hand figure. The second finger is used only in adding the extreme right-hand figure.

With eyes on the work—no glancing back and

forth from keyboard to work sheet—it is apparent that the danger of misreading figures is greatly reduced. The superior adaptability of the Comptometer to touch operation gives it a positive advantage in speed-with-accuracy.

<u>No. 1</u>	<u>No. 2</u>	<u>No. 3</u>	<u>No. 4</u>	<u>No. 5</u>	<u>No. 6</u>	<u>No. 7</u>
212	367	378	24.36	54.56	33.45	70.00
364	238	265	42.67	43.21	65.34	543.21
543	762	532	43.24	32.61	77.21	29.00
267	926	461	62.42	11.33	43.12	98.23
845	545	637	17.56	32.24	63.33	378.80
963	823	572	24.36	82.27	63.44	345.45
787	415	726	21.11	72.56	14.55	896.87
312	564	847	32.35	23.24	54.33	454.22
357	382	623	46.54	72.27	25.98	30.00
386	637	549	22.66	44.45	65.67	27.42

Add each column and write the total obtained. Then prove at once by re-adding the column. For practice add each column four times in order to fix firmly in mind the combinations used.

"Split" Method of Addition

In adding long columns it is often an advantage to split the items, adding first the cents and then the dollars. Add columns number 4, 5, 6 and 7 using this method. First add cents only, adding the tens with the first finger and the units with the second finger, leaving the total of cents in the answer dials.

Then add the dollars, using the first finger for the tens and the second finger for the units. Correct selection of keys is made entirely by sense of touch. In adding column number 7 use the first finger for both hundreds and tens of dollars.

Add each column and write the total obtained. Then prove at once by re-adding the column. For practice add each column at least four times in order to fix firmly in mind the combinations used.

As previously mentioned under General Addition Instructions, a locked keyboard is a positive signal of misoperation. The rule for correcting misoperation is found on page 5.

CONTROLLED-KEY

THE "Controlled-Key" is a positive system of automatic control which prevents operating errors caused by fumbled or incomplete key strokes. The "Controlled-Key" mechanism gives instant signal of an operating error, by locking all columns except the column in which the incomplete key stroke was made—and this is left open for correction. With positive protection against operating errors, the operator can speed up safely and be assured of a higher degree of first time accuracy.

How to Correct an Incomplete Key Stroke

There is no guesswork required in using **Controlled-Key**, neither is there a complicated formula to follow.

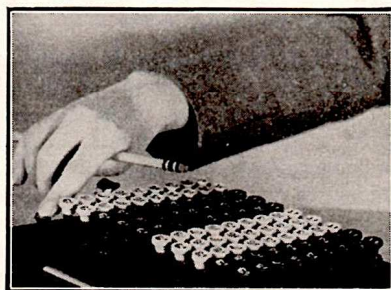
In adding, when a locked keyboard signals an operating error, the use of **Controlled-Key** is as simple as going back to the last key operated. If this key is left open for correction, complete the stroke, touch the red release button and continue adding, starting on the key that locked and signaled the error as shown in the example.

Example:

In adding this short column, intentionally press the 5 cent key part way down. On attempting to strike the 2-key, you find it locked. Go back and depress again the last key operated (5), touch the red release button and the correction is made. Continue adding on the key that locked and signaled the error, 2.

In adding, when a locked keyboard signals an operating error and the last key operated is found locked, touch the red release button, add in the previous key in same column, and continue adding

.45
.23
.34
.12
—
1.14



After correcting the incomplete key stroke, touch the red release key and continue adding.

with the key that locked and signaled the error as shown in the example.

Example:

In adding this column, intentionally press the 30-key part way down. Then give the 40-key a regular stroke. On attempting to strike the 5-key, you find it locked. To correct, go back to the last key depressed (40), and you will find it locked. Touch the red release button and add in the previous key (30). This completes the correction. Continue adding, beginning on the key that locked and signaled the error, 5.

.22
(3) .75
.16
.80
.20
—
2.13

In Multiplication and Division

When the key locks, the positive danger signal prevents an error slipping into an answer without the knowledge of the operator.

Owing to the speed of the Comptometer, it is simpler, and faster to cancel and go over the problem than to stop and make the correction.

MULTIPLICATION

Example: Multiply 1364 x 57

PLACE the first finger of the left hand on the 50 key and the first finger of the right hand on the 7 key. Strike the 57 in this position as many times as the right-hand figure (4) of the multiplicand indicates. Move both fingers one column to the left and strike as many times as indicated by the second figure (6) of the multiplicand. Continue to move to the left, striking in each column the multiplier as many times as indicated by the successive figures (3—1) of the multiplicand.

In beginning multiplication confine yourself to the use of the first finger of the right hand and the first finger of the left hand.

After the fingers have been positioned on the keys representing the multiplier, strike slowly, giving each key a full push-stroke, until you feel it strike bottom. Raise the fingers slightly above the keys after each stroke. Speed will develop quickly.

After placing the fingers on the proper keys, look at the example, rather than the keyboard, so that the figures will not be misread.

In each of the following examples use the first finger of the left hand for the tens figure of the multiplier and the first finger of the right hand for the unit figure:

<u>No. 1</u> 24,531 35	<u>No. 2</u> 12,456 68	<u>No. 3</u> 5,315 64	<u>No. 4</u> 23,456 75	<u>No. 5</u> 84,143 79
<u>No. 6</u> 35,642 45	<u>No. 7</u> 15,341 88	<u>No. 8</u> 45,673 28	<u>No. 9</u> 36,341 23	<u>No. 10</u> 14,683 47
<u>No. 11</u> 89,986 37	<u>No. 12</u> 15,366 15	<u>No. 13</u> 65,418 31	<u>No. 14</u> 94,345 63	<u>No. 15</u> 14,312 86
<u>No. 16</u> 26,433 19	<u>No. 17</u> 46,541 91	<u>No. 18</u> 63,222 83	<u>No. 19</u> 46,812 61	<u>No. 20</u> 46,533 11

Example: Multiply 314 x 45

Place the first and second fingers of the right hand on the keys in the right-hand columns representing the multiplier (45), and strike as many times as indicated by the right-hand figure (4) of the multiplicand; move the fingers one column to the left and strike as many times as the second figure (1) of the multiplicand indicates. Continue to move to the left, striking as many times as the succeeding figure (3) of the multiplicand indicates.

The first and second fingers of both hands are more commonly used than any of the other fingers. A safe rule to follow is to use the longest finger for the highest number.

Multiply each of the following problems, using the fingers as shown by the abbreviations in front of, and following the multiplier. 1L and 2L indicate first and second fingers of the left hand. 1R and 2R indicate first and second fingers of the right hand.

Raise the fingers slightly above the keys after each stroke.

<u>No. 1</u> 43 1R <u>34</u> 2R	<u>No. 2</u> 13 2R <u>42</u> 1R	<u>No. 3</u> 47 1L <u>62</u> 1R	<u>No. 4</u> 83 1L <u>37</u> 1R	<u>No. 5</u> 276 1L <u>345</u> 1 & 2R
<u>No. 6</u> 19 2R <u>54</u> 1R	<u>No. 7</u> 342 1L <u>153</u> 2 & 1R	<u>No. 8</u> 43 1L <u>39</u> 1R	<u>No. 9</u> 43 1L <u>13</u> 1R	<u>No. 10</u> 56 <u>89</u> 1 & 2R
<u>No. 11</u> 75 1R <u>46</u> 2R	<u>No. 12</u> 83 1L <u>87</u> 1R	<u>No. 13</u> 28 1L <u>19</u> 1R	<u>No. 14</u> 284 1L <u>324</u> 1 & 2R	<u>No. 15</u> 104 1L <u>678</u> 1 & 2R

For practice purposes it may be convenient to split the multiplier when it contains four figures. Example: Multiply 12,365 x 8,379. First multiply 12,365 by 79, leaving the result in the machine. Then multiply 12,365 by 83, starting the 83 in the fourth and third columns.

NOTE: A hyphen indicates where the multiplier should be split. When multiplying with two figures, the first finger of each hand is usually used. Point off as many places from the right as there are decimals in both factors.

<u>No. 16</u> 67.44 1L <u>735</u> 1 & 2R	<u>No. 17</u> 245.6 <u>65-35</u>	<u>No. 18</u> 5613 <u>27-18</u>	<u>No. 19</u> 584.26 <u>53-78</u>	<u>No. 20</u> 5362 1L <u>.523</u> 1 & 2R
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No. 211746543-45No. 22150821L 31.04 1 & 2RNo. 231346119-19No. 241372373-65No. 25191.4792-23No. 26481737-29No. 27.54471L 625 1 & 2RNo. 28671473-68No. 29367294-45No. 30574.416-17

Large Decimal Multiplications

IN MULTIPLYING large numbers containing decimals, it is advisable to strike from the left toward the right. Hold the multiplier with its left-hand figure on the left-hand column of the machine. Strike here as many times as is shown by the left-hand figure of your multiplicand, and then move one column to the right, etc. Point off as many answer dials from the left as the sum of the whole places in the multiplicand and multiplier.

Example: Multiply 12.345 x 4.356

Hold 4356 with the 4 on the left-hand column of

the machine and in this position strike once. Move each finger one column to the right and strike two times; one more column to the right and strike three times—then four times, then five times. The result as it stands in the answer dials is 053774820. (An eight column Comptometer was used in figuring this problem.) There are two whole places in 12.345 and one in 4.356, making together three answer dials to point off from the left of the machine, and the answer is 53.77482.

NOTE: Hyphen in multiplier indicates where it may be split.

Examples:

No. 1346.211L 4.67 1 & 2RNo. 214.3742 & 1L 32.78 1 & 2RNo. 32.26359.4-56No. 4.3562491.-47No. 511.4631L 37.8 1 & 2RNo. 64627.11L .846 1 & 2RNo. 726.5162 & 1L 21.68 1 & 2RNo. 8314.627.3-49No. 9243.822 & 1L 53.33 1 & 2RNo. 10986.42 & 1L 31.32 2 & 1RNo. 11328.6416.-17No. 12304.692 & 1L 216.7 1 & 2R

Three-Factor Multiplication

WHEN three numbers are to be multiplied such as, 57 bolts of 12 yards each at \$1.25 per yard, proceed as follows: Multiply 57 x 12 on the right of the machine. Leave the result 684 in the answer dials. Since 684 is registered in the machine once it is necessary to multiply it only 124 times more. Therefore, hold 124 with the 4 over the

left-hand figure (6) of the 684. Strike the number of times indicated, six; move to the right one column and strike the number of times indicated, eight. Move one more column to the right and strike four times. The answer is \$855.00. In moving from left to right, the figure in the answer dial under the 4 key shows the number of times 124 should be struck.

Examples:

No. 1

$$345 \times 289 \times .56$$

No. 2

$$789 \times 88 \times 5.46$$

No. 3

$$6452 \times 344 \times .66$$

No. 4

$$33 \times 875 \times 4.58$$

No. 5

$$645 \times 4456 \times .28$$

No. 6

$$389 \times 673 \times 438$$

No. 7

$$75 \times 6489 \times 567$$

No. 8

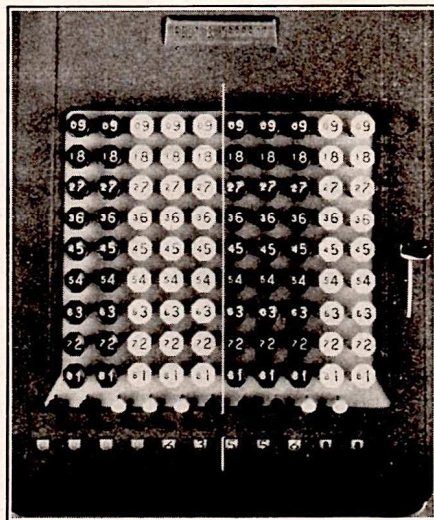
$$372 \times 44 \times 8879$$

NOTE: Point off as many places from the right as the sum of the decimals in the three factors.

Permanent Decimal Point Multiplication

WHEN factors contain changing decimals it will be easier and faster for the operator to use a method of working the multiplications over a fixed or Permanent Decimal Point. Between the fifth and sixth column of keys, directly over Decimal Pointer No. 5, is the position known as the Permanent Decimal Point. See illustration.

Usually the price factor is held on the keyboard—dollars to the left of the Permanent Decimal Point, and cents to the right of the Permanent Decimal Point. With the price factor in this position strike it in as many times as the unit figure of the quantity indicates.



Permanent Decimal Point—this is located between the fifth and sixth column of keys, directly over Decimal Pointer No. 5.

Move price factor one column to the left for each additional whole number in the quantity, and one column to the right for each column of decimals in the quantity.

Example:**345 lbs. @ \$.65 per lb.****Answer \$224.25**

Hold price factor \$.65 so that the 6 key is held in the fifth column and the 5 key in the fourth column. Strike the price factor five times for the unit figure of quantity. Move price factor one column to the left and strike it four times for the TENS figure of quantity. Move price factor again one column to the left

and strike it three times for the HUNDREDS figures of the quantity—\$224.25 now appears in the answer dials correctly pointed off.

Work the following problems over the Permanent Decimal Point, following the explanation in the previous paragraph.

Examples:

1. 307 hrs. @ \$.45 per hr. = \$138.15
2. 65 doz. @ .22 per doz. = 14.30
3. 45 tons @ 7.75 per ton = 348.75
4. 15 days @ 4.50 per day = 67.50
5. 241 bolts @ .67 each = 161.47

Accumulative Multiplication Using Permanent Decimal

A RAPID and accurate method of checking and proving original multiplications is by accumulation. This method is very effective in proving payrolls, cost sheets, material requisitions, inventory sheets, invoices, etc.; in fact it should be used wherever it is desired to total the products of several multiplications. To obtain the best results from accumulative multiplication, it should be performed over the fixed or Permanent Decimal Point. This Permanent Decimal Point is between the fifth and sixth columns, or as previously explained, directly over Decimal Pointer No. 5.

It is easy to remember that the sixth (white) column of keys is UNITS of DOLLARS; the fifth column is TENS of CENTS and the fourth column is UNITS of CENTS.

Example:

4¾ (4.75) yards @ \$1.25
 16½ (16.5) yards @ .34½
 148¼ (148.25) yards @ .06¼
 Accumulated Product \$20.90

Hold the price \$1.25 with the 1 in the sixth (white) column, the 2 in the fifth and the 5 in the fourth column. Multiply toward the right; strike four times, seven times, and five times. The answer dials show \$5.9375. LEAVE THIS IN THE MACHINE.

Multiply the second item in a similar manner holding .345 with the 3 in the fifth, 4 in the fourth, and 5 in the third columns, respectively. As the yardage commences in the TENS COLUMN, move the price position one column to the left before commencing

the multiplication. Strike from left to right one, six, and five times, respectively, and the accumulation in answer dials now shows \$11.63. LEAVE THIS IN THE MACHINE.

For the third item hold .0625 with the 6 in the fourth column. As the yardage commences in the HUNDREDS COLUMN, move the price position two columns to the left before starting the multiplication. Strike in the keys one, four, eight, two, and five times in their respective columns. The accumulated answer of \$20.895 now appears in answer dials. If at any time fingers drop off the keyboard on THE RIGHT-HAND SIDE, continue to strike with fingers that still remain on keyboard.

By the use of this method positive proof is obtained on:

- (a) Each individual extension
- (b) Decimal point in the final result
- (c) Addition of items

Always take the **price position** on keyboard as previously explained—if the quantity has more than one whole number move the price position (before multiplying) one column to the left on the keyboard for each additional whole number in the quantity. For instance, move one column to the left for $48\frac{3}{4}$, two columns for $236\frac{3}{4}$, etc.

Example No. 1

$1\frac{1}{8}$	(1.125)	yards	@ \$.48
$12\frac{1}{4}$	(12.25)	yards	@ .64 $\frac{3}{4}$
67		yards	@ .50
$6\frac{3}{8}$	(6.375)	yards	@ 1.23
Accumulated Total			\$49.81

Example No. 2

$16\frac{2}{3}$	(16.667)	yards	@ \$.34 $\frac{1}{2}$
172		yards	@ .06 $\frac{1}{2}$
$25\frac{1}{4}$	(25.25)	yards	@ 1.89
256		yards	@ .19
Accumulated Total			\$113.29

FIRST-TIME ACCURACY

ONLY when machine figuring becomes entirely automatic and the human element of error in operation ceases to be a factor, can there be dependable first-time accuracy in mechanical calculation.

This is evidenced by the fact that accounting offices in which first-time results are accepted without being checked or refigured, are so few as to be negligible. When working against a predetermined

total such proof is, of course, unnecessary.

First-time machine figuring, however, should closely approximate absolute accuracy on all classes of figure work.

With the Comptometer it does that.

In figuring a recent inventory of a chain of 100 grocery stores, the first-time accuracy of the Comptometer was 99.551%.

Subtraction

Subtraction is the process of finding the difference between two numbers. This is performed on the Comptometer by using the small figures on the key-tops and the subtraction "cut-off" or button.

NOTE: When using the Model M Comptometer do not hold the subtraction button after setting it for a subtraction. It returns to normal when the carry has been foiled.

Example: $98 - 75 = 23.$

Put 98 in the right of keyboard. Hold back "cut-off" or button (see note) at the left of the figure 9; depress a small 7 in the second column and a small 4 (5 less 1) in the first column — answer 23. To prove, add 75 to 23 in machine. Answer 98 agrees with amount started with.

Example: $845 - 702 = 143.$

Put 845 in the right of keyboard. Hold back "cut-off" or button (see note) at the left of the figure 8; depress a small 7 in the third column, a small cipher in the second column, and a small 1 (2 less 1) in the first column — answer 143. To prove, add 702 to 143 in machine. Answer 845 agrees with amount started with.

Example: $\$28.64 - \$9.62 = \$19.02$

Put 28.64 in right of keyboard. Hold back "cut-off" or button (see note) at left of figure 2. Borrow from fourth column by depressing cipher key; as there are no small 9 figures, ignore the 9 in the third column, depress small 6 in the second column and a small 1 (2 less 1) in the first column — answer \$19.02. To prove, add \$9.62 to \$19.02 in machine. Answer \$28.64 agrees with amount started with.

The processes to follow in subtraction:

1. Put larger amount in the Comptometer.
2. Hold back "cut-off" or button at the left of an amount in the register equal to or larger than the amount to be subtracted.
3. Holding back the "cut-off" or button depress the amount to be subtracted in small figures, less one.
4. If necessary to borrow, hold back the "cut-off" or button at the left of the column or columns from which you borrow. Depress the small cipher key in such column or columns.

Cipher keys are used in the amount to be subtracted if they come between figures of value, but are ignored if at the end of a number. The 9's are ignored unless they come at the end of a number when one less than nine (8) is depressed.

The apostrophe in the following problems indicates where the "cut-off" or button is to be held back.

1. '4.36 Add large figures
1.25 Small figures 124

3.11
3. '21.43 Add large figures
6.42 Small figures 0641

15.01
5. '65.23 Add large figures
31.00 Small figures 30**

34.23
7. '15.60 Add large figures
8.83 Small figures 0882

6.77

2. '8.34 Add large figures
.68 Small figures 067

7.66
4. 1'70.36 Add large figures
.85 Small figures 0084

169.51
6. '6.42 Add large figures
1.93 Small figures 1*2

4.49
8. '48.50 Add large figures
9.60 Small figures 0*5*

38.90

Use of Small Figures in Subtraction or Division

NOTE 1. In subtracting or dividing, use the keys with the corresponding small figures, except for the right-hand figure of value, for which one less must be used.

	Right-Hand Figure of Value			
	↓	↓	↓	↓
To subtract or divide with	462	127	3600	4620
Use small figures	461	126	35	461

NOTE 2. The small cipher keys should be depressed the same as any other figure when they appear between figures of value, as in 704, but should be disregarded if they are at the right of the amount, as in 7500.

To subtract or divide with	704
Use small figures	703
To subtract or divide with	7500
Use small figures	74
To subtract or divide with	46005
Use small figures	46004

To subtract or divide with 63500
Use small figures 634

NOTE 3. If the right-hand figure of value in the amount is a 1, then one less is 0, and this small cipher should be struck.

To subtract or divide with	3241
Use small figures	3240
To subtract or divide with	3100
Use small figures	30

NOTE 4. As there are no small 9 keys, pass any column which contains 9; except where 9 is the right-hand figure of value, then the small 8 is used.

To subtract or divide with	8947
Use small figures	8 46
To subtract or divide with	1695
Use small figures	16 4
To subtract or divide with	983
Use small figures	82
To subtract or divide with	379
Use small figures	378

*Used to designate columns in which no keys are depressed.

DIVISION

DIVISION is the process of finding the number of times one number is contained in another.

Although division is not used as frequently in the average office as addition and multiplication, it is, however, very important and used extensively in statistics of all kinds.

The machine method of division is more simple on the Comptometer than the mental or written process for it consists merely of a series of subtractions and the quotient, or answer figure, is a record of the number of subtractions made.

Division on the Comptometer is as simple as any other operation. The underlying principle of division is explained in the following example:

Example: $1477.63 \div 133$

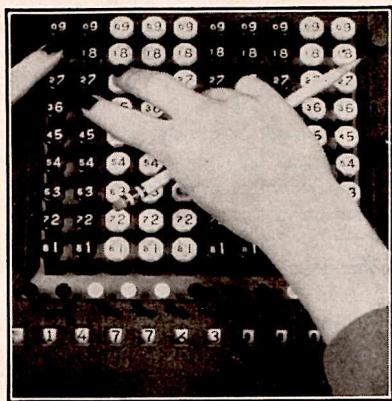
Place 147763 (the dividend) into the left side of the Comptometer using large figures.

Pull down the decimal pointer on the machine in the same position as it appears in the written dividend. (1477|63). The divisor (133) contains three

DIVIDEND DECIMAL

whole numbers; that is, it has three figures to the left of its decimal point. Move your finger to the left of the dividend decimal position three places. Pull down the pointer in this position. You have now established the decimal point for your answer. (1|47763).

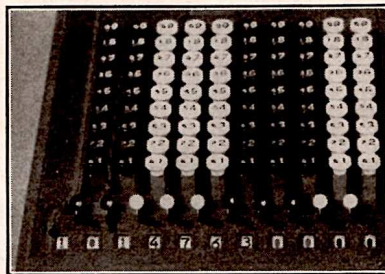
ANSWER DECIMAL



Hold 133 (the divisor) using small figures less one (132) directly over 147. Depress these divisor keys until the amount in the register dials at the base of the columns in which you are holding the divisor is less than 133.

In this example, the remainder is 014, which is less than your divisor, 133.

Move your divisor position, held on the keyboard, one place to the right. You are now holding your divisor over 147 in the register dials.



Remainder is 014.

Depress 132 (divisor figures). Remainder is 014 which is less than your divisor 133.

Move your divisor position, held on keyboard, one place to the right. You are now holding your divisor over 146 in the register dials.

Depress 132 (divisor figures). The remainder is 013 which is less than your divisor, 133.

Move your divisor position, held on keyboard, one place to the right. You are now holding your divisor over 133 in the register dials.

Depress 132 (divisor figures). The remainder is 000.

Copy your answer — 11.11.

Example: $8153.40 \div 254$

Place 815340 (the dividend) into the left side of the Comptometer using large-numbered keys.

Locate your dividend decimal position: 8153|40.

DIVIDEND DECIMAL

Establish your answer decimal point position: 8|15340.

ANSWER DECIMAL

Hold your divisor 254 (using small-figured keys 253) over 815 in the register dials.

Depress 253 (divisor figures) until the remainder in the register dials is less than the divisor, 254. Remainder is 053.

Move your divisor position, held on keyboard, one place to the right over 533 in the register dials.

Repeat depressing and moving until the entire problem is completed.

Answer: 32.10.

Practice Division Problems

$$\begin{array}{r} 4775.38 \div 226 = 21.13 \\ 2326.59 \div 189 = 12.31 \\ 6265.45 \div 145 = 43.21 \\ 95061.75 \div 175 = 543.21 \\ 978879.74 \div 487 = 2010.02 \end{array}$$

When we have a problem in division such as:

$$194.25 \div 875$$

Put 19425 (the dividend) into the Comptometer.

Establish dividend decimal point.

Point off three places to the left of the dividend decimal position to establish the answer decimal position.

Hold 875 (divisor figures), using small figures 874, over 194. 194 is less than divisor 875.

Move your divisor position, held on keyboard, one place to the right. You are now holding your divisor over 1942 in the register dials.

This is the only difference in the operation of division you have learned so far.

Depress 874 (divisor figures) as many times as shown by the figure in the register dial at the left of the columns in which you are holding the divisor.

The figure 1 appears to the left of these columns.

Depress 874 (divisor figures) one time. The figure 1 changed to 2.

Depress 874 one more time to equal the figure 2. 192 (remainder figure) is less than 875.

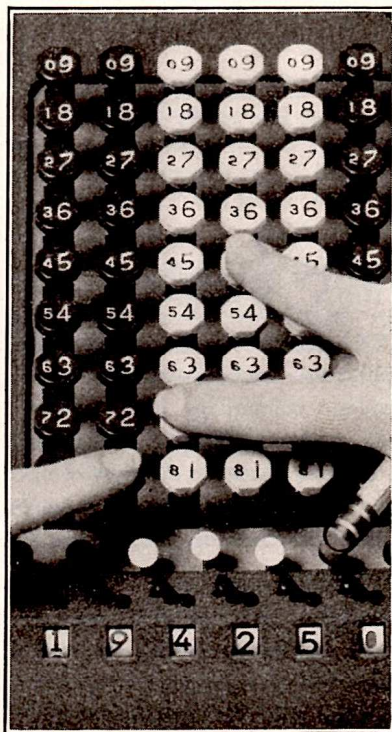
Move your divisor position, held on keyboard, one place to the right.

The number in the register dial at the left of the columns in which you are holding the divisor is 1.

Depress 874 (divisor figures) one time. The figure 1 changed to 2.

Depress 874 (divisor figures) one more time to equal the figure 2. 175 (remainder figure) is less than 875.

Move your divisor position, held on keyboard, one place to the right.



Hold the Divisor over 1942 in the Register Dials.

The number in the register dial at the left of the columns in which you are holding the divisor is 1.

Depress 874 (divisor figures) one time.

The number 1 in the register dial at the left of the columns in which you are holding the divisor did not change.

The remainder is 875. Depress 874 (divisor figures) one time.

Answer is .222.

For all practical purposes it is unnecessary to carry division beyond the fourth figure to the right of the decimal point.

POINTING OFF IN DIVISION

Pointing off on the Comptometer in division is very simple and accurate. Turn down the decimal pointer in the register to agree with the decimal point in the dividend. To establish the ANSWER DECIMAL POINT turn down the pointer as many places to the left of the dividend decimal point as there are figures to the left of the decimal point in the divisor. See Illustration.

Example: $134.5 \div 25 = 5.38$

Put the dividend 134.5 into the left side of keyboard. Pull down the decimal pointer between the 4 and 5 to correspond to the decimal point appearing in the dividend. As 25 is a whole number with two figures (2 and 5) we turn down the decimal pointer to the left of the dividend decimal point two places between the 1 and 3. See illustration. This simple method of establishing an accurate decimal position in the answer is found only on the Comptometer.

Drill carefully on the following problems and check your answers with those shown here.

1. $41.778 \div 45 = .9284$

3. $297.364 \div 34 = 8.746$

5. $1307.68 \div 22 = 59.44$

2. $16.7772 \div 44 = .3813$

4. $2377.2 \div 56 = 42.45$

6. $89089 \div 89 = 1001$

If the divisor is a decimal without preceding ciphers the answer pointer is the same as the dividend pointer; but if the divisor has preceding ciphers like .0025 the answer pointer is as many places to the right of the dividend pointer as there are ciphers immediately to the right of the decimal point in the divisor. See illustration.

As there are no small 9 figured keys, leave blank any column which contains 9; except where 9 is the right-hand figure of value, then the small 8 key is used.

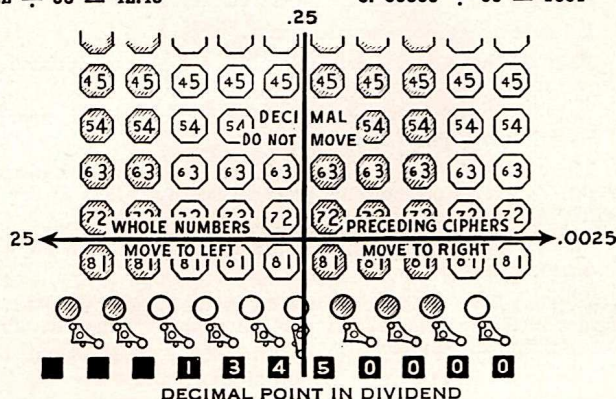


Illustration Showing Direction to Move Decimal Point in Division.

The small cipher keys should be depressed the same as any other figure when they appear between figures of value, as in 704, but should be disregarded if they are at the right of the amount, as in 7500. In the latter case, the divisor 7500 would be held as 75 less one (74).

Long Division

Easy Method for Dividing by Five or More Figures, Using Four-Place Trial Divisor and Obtaining Three Answer Figures at a Time

Example: $4567.89 \div 2436.65 =$

Apply rules for pointing off as indicated in illustration above.

After pointing off, register shows 0'456789.

Divide by first four figures of divisor, using small figures on keys (not taking one less) and don't stop dividing until you get the first three answer figures. After getting the third answer figure, continue to hold with left hand the position of the two left-hand figures of divisor.

Place fingers of right hand on columns immediately to right of the two columns held with left hand, on keys for the remaining unused figures* of divisor, holding according to small figures and one less for the extreme right-hand figure of value of divisor. Leave left hand inactive on keyboard.

Depress keys held by right hand the number of times as indicated by first of the three answer figures already obtained. Then move right hand one position to right and strike as many times as indicated by the second answer figure. Again move right hand one position to right and strike as many times as indicated by the third answer figure already obtained.

The left hand remains inactive on keyboard.

Resume holding first four figures of divisor, with position for first two figures on the columns marked with left hand, and the position for next two figures on columns immediately to the right.

(If remainder, in register under columns held, should be equal to or larger than the divisor, depress complete divisor once more.)

Move finger position one place to right, and divide to get the next three answer figures, exactly the same way as the first three were obtained.

It is not necessary to strike in the remaining figures of divisor the second time, as these figures would not affect a six-place answer.

Divide 0'456789 by 2436 (holding small figures 2436 with two hands) and don't stop dividing until you get the first three answer figures—187. Don't take the fingers of the left hand from keys 24.

Right-hand fingers take positions on small figures 64 (65 less 1) on columns immediately to right of position held with the left hand.

From left to right, strike small figures 64 once, then move to right and strike eight times, then move to right and strike seven times. Register shows 1'87113545.

Fingers of right hand take position on small figures 36. Right and left hand now hold small figures 2436.

Remainder 1135 is not larger than 2436.

Move both hands one position to the right and divide again by 2436 to get three more answer figures.

Register shows 1'87465. Answer 1.87465.

* If it is not convenient to hold all at once with the right hand the remaining unused figures of the divisor, then hold one or two of the remaining figures at a time.

Division Short Cut

In practical every day work, division is used a great deal in the figuring of averages and percentages. For this reason it is unnecessary in many cases to obtain more than three or four decimal places in the answer.

Example:

Sales	\$48,672.392
Profit	2,782.679
Find percent of profit to sales	
\$ 2,782.679	= .0572 or 5.72%
\$48,672.392	

Dividing four figures of the dividend (2782) by four figures of the divisor (4867 minus 1) will provide an answer sufficient for practical purposes. A safe rule to follow is to hold **one more figure of the divisor** than figures desired in the answer.

The carrying out of decimals beyond the actual number of places required is a needless waste of time and energy.

Reciprocal Division

The use of reciprocal division in cost, payroll, and statistical work will be very helpful to the operator. The simplicity of this method of division, in addition to its time-saving feature, makes its use very desirable. This method is nothing more than converting division into a multiplication process.

Multiplying any dividend by the reciprocal of its divisor produces the same answer as that obtained by actual division. To obtain the reciprocal of any number, merely divide that number into the figure 1.

Illustration:

Reciprocal of 8 is $1 \div 8$ or .125	
Reciprocal of 413 is $1 \div 413$ or .00242130	(See Payroll Example)
Reciprocal of 555 is $1 \div 555$ or .00180180	(See Statistical Example)
Reciprocal of 755 is $1 \div 755$ or .00132450	(See Cost Example)

Reciprocals (See Back Page) of any number from 1 to 2,000 will be found on Reciprocal Card No. 9; and from 1 to 10,000 in Reciprocal Book, form 192.

The easiest way to do reciprocal divisions is to hold the dividend over Permanent Decimal Pointer No. 5, multiplying it from left to right by the recipi-

cal of the divisor. Always point off to the left of the Permanent Decimal Point as many places as there are whole numbers in the divisor. The decimal point and preceding ciphers in the reciprocal are entirely disregarded if the problem is worked over the Permanent Decimal Point.

Example of Cost Work:

755 pieces cost \$66.06. What is the average cost per piece? Answer, \$.0875.
 $\$66.06 \div 755$ is the same as $\$66.06 \times .0013245$ (reciprocal of 755).

Hold the dividend \$66.06 over Permanent Decimal Pointer No. 5 and multiply it by the reciprocal of 755. From left to right strike in the dividend one, three, two, four, and five times respectively. As the

divisor (755) contains three whole numbers, it requires pointing off to the left of Permanent Decimal Pointer No. 5 three places. The answer dial now shows \$.0875.

Example of Payroll Work:

\$35.00 earned in 41.3 hours. What is the average hourly rate? Answer, \$.847.
 $\$35.00 \div 41.3$ is the same as $\$35.00 \times .024213$ (reciprocal of 413).

Hold the dividend \$35.00 to left of Permanent Decimal Pointer No. 5 and multiply it by the reciprocal of 413. From left to right strike in the dividend two, four, two, one, and three times respectively.

As the divisor (41.3) contains two whole numbers, it requires pointing off to the left of Permanent Decimal Pointer No. 5 two places. The answer dial now shows \$.847.

Example of Statistical Work:

Department A Sales	\$104.56 =	.1884 or 18.84%
Department B Sales	75.54 =	.1361 or 13.61%
Department C Sales	344.21 =	.6202 or 62.02%
Department D Sales	22.14 =	.0399 or 3.99%
Department E Sales	8.55 =	.0154 or 1.54%
	<u>\$555.00</u>	<u>1.0000</u> <u>100.00%</u>

It is desired to know what percent of the total sales is represented by each department. This requires dividing each of the amounts by the total, or \$555.00.

As 555 contains three whole numbers, it requires pointing off three places to the left of Permanent Decimal Pointer No. 5. Hold the first dividend, \$104.56, to the left of Permanent Decimal Pointer No. 5, and multiply it by the reciprocal of 555. From left to right strike in the dividend one, eight, zero, one, and eight times respectively. The answer dial shows .1884 or 18.84%. In the same manner hold the other departments and multiply by the same reciprocal. To prove accuracy of the work add the results

obtained; these should total 1 or 100%, as the case may be.

In the ordinary division problems found in cost, payroll, and statistical work a four-figure answer is usually sufficient. In order to obtain four-figure accuracy it will be necessary to use six figures of the reciprocal. A safe rule to follow is to use two more figures of the reciprocal than desired figure places in the answer—that is, if a four-place answer is desired use six of the reciprocal figures, if a five-place answer is desired use seven figures of the reciprocal.

With a little practice and the use of Reciprocal Card No. 9, the operator will develop speed on this simple method of division.

	100	200	300	400	500	600	700	800	900
1	1 000.000	100 10.0000	200 5.00000	300 3.33333	400 2.50000	500 2.00000	600 1.66667	700 1.42857	800 1.25000
2	500.000	01 9.00009	02 4.97512	03 3.72226	04 3.00000	05 2.49377	06 2.14286	07 1.85714	08 1.66667
3	333.333	02 9.80392	03 4.95050	04 3.71162	05 2.97556	06 2.49203	07 2.14286	08 1.85714	09 1.66667
4	250.000	03 9.70794	04 4.92611	05 3.70033	06 2.98139	07 2.49087	08 2.14286	09 1.85714	10 1.66667
5	200.000	04 9.63381	05 4.90196	06 3.68247	07 2.97556	08 2.49087	09 2.14286	10 1.85714	11 1.66667
6	166.667	05 9.57281	06 4.87805	07 3.65869	08 2.95112	09 2.47524	10 2.12857	11 1.83333	12 1.66667
7	142.857	07 9.51799	08 4.85428	09 3.63543	10 2.92667	11 2.45714	12 2.10714	13 1.81250	14 1.66667
8	125.000	08 9.46392	09 4.83092	10 3.61260	11 2.90714	12 2.43750	13 2.08333	14 1.78571	15 1.66667
9	111.111	09 9.41431	10 4.80769	11 3.59143	12 2.88235	13 2.41762	14 2.05882	15 1.75714	16 1.66667
10	100.000	10 9.37000	11 4.78169	12 3.56842	13 2.86301	14 2.39583	15 2.01754	16 1.73571	17 1.66667
11	90.9091	11 9.32611	12 4.73934	13 3.52543	14 2.81818	15 2.36585	16 2.00000	17 1.70000	18 1.66667
12	83.3333	12 9.28222	13 4.69565	14 3.48429	15 2.78125	16 2.33333	17 1.96078	18 1.66667	19 1.66667
13	76.9231	13 9.23833	14 4.65116	15 3.43981	16 2.73684	17 2.29167	18 1.92308	19 1.66667	20 1.66667
14	71.4286	14 9.19444	15 4.60667	16 3.39535	17 2.69231	18 2.25000	19 1.88571	20 1.66667	21 1.66667
15	66.6667	15 9.15056	16 4.56222	17 3.35086	18 2.64792	19 2.20588	20 1.85714	21 1.66667	22 1.66667
16	62.5000	16 9.10667	17 4.51778	18 3.30637	19 2.60344	20 2.16250	21 1.81250	22 1.66667	23 1.66667
17	58.8235	17 9.06279	18 4.47329	19 3.26188	20 2.56000	21 2.11762	22 1.76923	23 1.66667	24 1.66667
18	55.5556	18 9.01889	19 4.42880	20 3.21739	21 2.51556	22 2.07222	23 1.72571	24 1.66667	25 1.66667
19	52.3161	19 8.97499	20 4.38431	21 3.17290	22 2.46344	23 2.02778	24 1.68421	25 1.66667	26 1.66667
20	50.0000	20 8.93111	21 4.33981	22 3.12842	23 2.41818	24 2.00000	25 1.64286	26 1.66667	27 1.66667
21	47.6190	21 8.88722	22 4.29565	23 3.08393	24 2.37290	25 1.95377	26 1.60000	27 1.66667	28 1.66667
22	45.4545	22 8.84333	23 4.25116	24 3.03947	25 2.32769	26 1.90909	27 1.55556	28 1.66667	29 1.66667
23	43.4783	23 8.79944	24 4.20667	25 2.99500	26 2.28235	27 1.86364	28 1.51111	29 1.66667	30 1.66667
24	41.6667	24 8.75556	25 4.16222	26 2.95056	27 2.23750	28 1.81818	29 1.46667	30 1.66667	31 1.66667
25	40.0000	25 8.71169	26 4.11778	27 2.90607	28 2.19231	29 1.77273	30 1.42308	31 1.66667	32 1.66667
26	38.4615	26 8.66778	27 4.07329	28 2.86158	29 2.14792	30 1.72833	31 1.37857	32 1.66667	33 1.66667
27	37.0370	27 8.62389	28 4.02880	29 2.81709	30 2.10344	31 1.68333	32 1.33333	33 1.66667	34 1.66667
28	35.7143	28 8.57999	29 3.98431	30 2.77260	31 2.05882	32 1.63889	33 1.28857	34 1.66667	35 1.66667
29	34.4828	29 8.53611	30 3.93981	31 2.72811	32 2.01431	33 1.59375	34 1.24308	35 1.66667	36 1.66667
30	33.3333	30 8.49222	31 3.89565	32 2.68364	33 1.96923	34 1.54923	35 1.19857	36 1.66667	37 1.66667
31	32.2581	31 8.44833	32 3.85116	33 2.63915	34 1.92474	35 1.50474	36 1.15370	37 1.66667	38 1.66667
32	31.2500	32 8.40444	33 3.80667	34 2.59467	35 1.88000	36 1.46000	37 1.10889	38 1.66667	39 1.66667
33	30.3030	33 8.36056	34 3.76222	35 2.55018	36 1.83571	37 1.41556	38 1.06389	39 1.66667	40 1.66667
34	29.4118	34 8.31667	35 3.71778	36 2.50569	37 1.79125	38 1.37143	39 1.01905	40 1.66667	41 1.66667
35	28.5714	35 8.27278	36 3.67329	37 2.46119	38 1.74677	39 1.32693	40 0.97429	41 1.66667	42 1.66667
36	27.7778	36 8.22889	37 3.62880	38 2.41670	39 1.70228	40 1.28235	41 0.92923	42 1.66667	43 1.66667
37	27.0270	37 8.18499	38 3.58431	39 2.37222	40 1.65778	41 1.23778	42 0.88462	43 1.66667	44 1.66667
38	26.3158	38 8.14111	39 3.53981	40 2.32773	41 1.61329	42 1.19329	43 0.83952	44 1.66667	45 1.66667
39	25.6410	39 8.09722	40 3.49535	41 2.28324	42 1.56882	43 1.14882	44 0.79444	45 1.66667	46 1.66667
40	25.0000	40 8.05333	41 3.45086	42 2.23875	43 1.52431	44 1.10431	45 0.74923	46 1.66667	47 1.66667
41	24.3902	41 8.00944	42 3.40637	43 2.19426	44 1.47974	45 1.05974	46 0.70421	47 1.66667	48 1.66667
42	23.8095	42 7.96556	43 3.36188	44 2.14977	45 1.43524	46 1.01524	47 0.65923	48 1.66667	49 1.66667
43	23.2558	43 7.92167	44 3.31739	45 2.10528	46 1.39074	47 0.97074	48 0.61421	49 1.66667	50 1.66667
44	22.7273	44 7.87778	45 3.27290	46 2.06079	47 1.34625	48 0.92625	49 0.56923	50 1.66667	51 1.66667
45	22.2222	45 7.83389	46 3.22842	47 2.01630	48 1.30176	49 0.88176	50 0.52421	51 1.66667	52 1.66667
46	21.7391	46 7.78999	47 3.18393	48 1.97181	49 1.25727	50 0.83727	51 0.47923	52 1.66667	53 1.66667
47	21.2765	47 7.74611	48 3.13944	49 1.92732	50 1.21278	51 0.79278	52 0.43421	53 1.66667	54 1.66667
48	20.8333	48 7.70222	49 3.09495	50 1.88283	51 1.16829	52 0.74829	53 0.38923	54 1.66667	55 1.66667
49	20.4082	49 7.65833	50 3.05046	51 1.83834	52 1.12380	53 0.70380	54 0.34421	55 1.66667	56 1.66667
50	20.0000	50 7.61444	51 3.00600	52 1.79385	53 1.07931	54 0.65923	55 0.30000	56 1.66667	57 1.66667
51	19.6078	51 7.57056	52 2.96111	53 1.74936	54 1.03482	55 0.61474	56 0.25500	57 1.66667	58 1.66667
52	19.2308	52 7.52667	53 2.91667	54 1.70487	55 0.99033	56 0.56923	57 0.21000	58 1.66667	59 1.66667
53	18.8679	53 7.48278	54 2.87222	55 1.66037	56 0.94583	57 0.52421	58 0.16479	59 1.66667	60 1.66667
54	18.5185	54 7.43889	55 2.82778	56 1.61588	57 0.90134	58 0.47923	59 0.11974	60 1.66667	61 1.66667
55	18.1818	55 7.39499	56 2.78333	57 1.57139	58 0.85683	59 0.43421	60 0.07421	61 1.66667	62 1.66667
56	17.8571	56 7.35111	57 2.73889	58 1.52690	59 0.81234	60 0.38923	61 0.02923	62 1.66667	63 1.66667
57	17.5455	57 7.30722	58 2.69444	59 1.48241	60 0.76783	61 0.34421	62 0.00000	63 1.66667	64 1.66667
58	17.2413	58 7.26333	59 2.65000	60 1.43792	61 0.72333	62 0.30000	63 0.00000	64 1.66667	65 1.66667
59	16.9492	59 7.21944	60 2.60556	61 1.39343	62 0.67883	63 0.25500	64 0.00000	65 1.66667	66 1.66667
60	16.6667	60 7.17556	61 2.56111	62 1.34894	63 0.63431	64 0.21000	65 0.00000	66 1.66667	67 1.66667
61	16.3934	61 7.13167	62 2.51667	63 1.30445	64 0.58983	65 0.16479	66 0.00000	67 1.66667	68 1.66667
62	16.1290	62 7.08778	63 2.47222	64 1.25996	65 0.54524	66 0.11974	67 0.00000	68 1.66667	69 1.66667
63	15.8730	63 7.04389	64 2.42880	65 1.21547	66 0.50074	67 0.07421	68 0.00000	69 1.66667	70 1.66667
64	15.6250	64 7.00000	65 2.38431	66 1.17100	67 0.45625	68 0.02923	69 0.00000	70 1.66667	71 1.66667
65	15.3846	65 6.95611	66 2.33981	67 1.12651	68 0.41176	69 0.00000	70 0.00000	71 1.66667	72 1.66667
66	15.1515	66 6.91222	67 2.29535	68 1.08202	69 0.36727	70 0.00000	71 0.00000	72 1.66667	73 1.66667
67	14.9254	67 6.86833	68 2.25086	69 1.03753	70 0.32278	71 0.00000	72 0.00000	73 1.66667	74 1.66667
68	14.7059	68 6.82444	69 2.20637	70 9.93083	71 0.27829	72 0.00000	73 0.00000	74 1.66667	75 1.66667
69	14.4928	69 6.78056	70 2.16188	71 9.88694	72 0.23380	73 0.00000	74 0.00000	75 1.66667	76 1.66667
70	14.2857	70 6.73667	71 2.11739	72 9.84245	73 0.18931	74 0.00000	75 0.00000	76 1.66667	77 1.66667
71	14.0845	71 6.69278	72 2.07290	73 9.79796	74 0.14482	75 0.00000	76 0.00000	77 1.66667	78 1.66667
72	13.8889	72 6.64889	73 2.02842	74 9.75347	75 0.10033	76 0.00000	77 0.00000	78 1.66667	79 1.66667
73	13.6986	73 6.60500	74 1.98393	75 9.70900	76 0.05583	77 0.00000	78 0.00000	79 1.66667	80 1.66667
74	13.5135	74 6.56111	75 1.93944	76 9.66451	77 0.01134	78 0.00000	79 0.00000	80 1.66667	81 1.66667
75	13.3333	75 6.51722	76 1.89495	77 9.62000	78 0.00000	79 0.00000	80 0.00000	81 1.66667	82 1.66667
76	13.1579	76 6.47333	77 1.85046	78 9.57556	79 0.00000	80 0.00000	81 0.00000	82 1.66667	83 1.66667
77	12.9870	77 6.42944	78 1.80600	79 9.53111	80 0.00000	81 0.00000	82 0.00000	83 1.66667	84 1.66667
78	12.8205	78 6.38556	79 1.76151	80 9.48667	81 0.00000	82 0.00000	83 0.00000	84 1.66667	85 1.66667
79	12.6582	79 6.34167	80 1.71702	81 9.44222	82 0.00000	83 0.00000	84 0.00000	85 1.66667	86 1.66667
80	12.5000	80 6.29778	81 1.67253	82 9.39778	83 0.00000	84 0.00000	85 0.00000	86 1.66667	87 1.66667
81	12.3457	81 6.25389	82 1.62804	83 9.35333	84 0.00000	85 0.00000	86 0.00000	87 1.66667	88 1.66667
82	12.1915	82 6.21000	83 1.58355	84 9.30889	85 0.00000	86 0.00000	87 0.00000	88 1.66667	89 1.66667
83	12.0482	83 6.16611	84 1.53906	85 9.26444	86 0.00000	87 0.00000	88 0.00000	89 1.66667	90 1.66667
84	11.9048	84 6.12222	85 1.49457	86 9.22000	87 0.00000	88 0.00000	89 0.00000	90 1.66667	91 1.66667
85	11.7647	85 6.07833	86 1.44999	87 9.17556	88 0.00000	89 0.00000	90		

COMPTONER RECIPROCAL TABLE-Continued

1001 to 2000

	1100	1200	1300	1400	1500	1600	1700	1800	1900
1001	99900	1100	99909	1200	83333	1300	76922	1400	71426
1002	99800	1100	99807	1200	83284	1300	76864	1400	71378
1003	99700	1100	99704	1200	83195	1300	76805	1400	71327
1004	99602	1100	99602	1200	83126	1300	76746	1400	71276
1005	99502	1100	99508	1200	83066	1300	76687	1400	71225
1006	99404	1100	99416	1200	82988	1300	76628	1400	71174
1007	99305	1100	99334	1200	82919	1300	76570	1400	71124
1008	99206	1100	99253	1200	82871	1300	76511	1400	71073
1009	99108	1100	99171	1200	82713	1300	76394	1400	70972
1010	99010	1100	99010	1200	82645	1300	76336	1400	70923
1011	98912	1100	99009	1200	82576	1300	76278	1400	70872
1012	98814	1100	98922	1200	82508	1300	76219	1400	70822
1013	98717	1100	98847	1200	82440	1300	76161	1400	70771
1014	98619	1100	98757	1200	82372	1300	76104	1400	70721
1015	98522	1100	98686	1200	82305	1300	76046	1400	70671
1016	98425	1100	98606	1200	82237	1300	75988	1400	70621
1017	98328	1100	98528	1200	82169	1300	75930	1400	70572
1018	98232	1100	98445	1200	82102	1300	75873	1400	70522
1019	98135	1100	98366	1200	82034	1300	75815	1400	70472
1020	98039	1100	98288	1200	81967	1300	75758	1400	70423
1021	97943	1100	98206	1200	81900	1300	75700	1400	70373
1022	97847	1100	98122	1200	81833	1300	75643	1400	70323
1023	97752	1100	98047	1200	81766	1300	75586	1400	70274
1024	97656	1100	97968	1200	81699	1300	75529	1400	70225
1025	97561	1100	97889	1200	81633	1300	75472	1400	70175
1026	97466	1100	97810	1200	81566	1300	75415	1400	70126
1027	97371	1100	97721	1200	81500	1300	75358	1400	70077
1028	97276	1100	97632	1200	81433	1300	75301	1400	70028
1029	97182	1100	97547	1200	81367	1300	75245	1400	69979
1030	97087	1100	97466	1200	81301	1300	75188	1400	69930
1031	96993	1100	97381	1200	81235	1300	75131	1400	69881
1032	96899	1100	97293	1200	81169	1300	75074	1400	69832
1033	96805	1100	97206	1200	81103	1300	75017	1400	69783
1034	96712	1100	97118	1200	81037	1300	74960	1400	69734
1035	96618	1100	97031	1200	80972	1300	74903	1400	69685
1036	96525	1100	96946	1200	80906	1300	74846	1400	69636
1037	96432	1100	96857	1200	80841	1300	74789	1400	69587
1038	96339	1100	96761	1200	80775	1300	74732	1400	69538
1039	96246	1100	96678	1200	80710	1300	74675	1400	69489
1040	96154	1100	96589	1200	80645	1300	74618	1400	69440
1041	96061	1100	96504	1200	80580	1300	74561	1400	69391
1042	95969	1100	96419	1200	80515	1300	74504	1400	69342
1043	95877	1100	96334	1200	80450	1300	74447	1400	69293
1044	95785	1100	96249	1200	80385	1300	74390	1400	69244
1045	95694	1100	96164	1200	80320	1300	74333	1400	69195
1046	95602	1100	96079	1200	80255	1300	74276	1400	69146
1047	95511	1100	95994	1200	80190	1300	74219	1400	69097
1048	95420	1100	95909	1200	80125	1300	74162	1400	69048
1049	95329	1100	95824	1200	80060	1300	74105	1400	69000
1050	95238	1100	95739	1200	80000	1300	74048	1400	68951
1051	95147	1100	95654	1200	79935	1300	73991	1400	68902
1052	95056	1100	95569	1200	79870	1300	73934	1400	68853
1053	94965	1100	95484	1200	79805	1300	73877	1400	68804
1054	94874	1100	95399	1200	79740	1300	73820	1400	68755
1055	94783	1100	95314	1200	79675	1300	73763	1400	68706
1056	94692	1100	95229	1200	79610	1300	73706	1400	68657
1057	94601	1100	95144	1200	79545	1300	73649	1400	68608
1058	94510	1100	95059	1200	79480	1300	73592	1400	68559
1059	94419	1100	94974	1200	79415	1300	73535	1400	68510
1060	94328	1100	94889	1200	79350	1300	73478	1400	68461
1061	94237	1100	94804	1200	79285	1300	73421	1400	68412
1062	94146	1100	94719	1200	79220	1300	73364	1400	68363
1063	94055	1100	94634	1200	79155	1300	73307	1400	68314
1064	93964	1100	94549	1200	79090	1300	73250	1400	68265
1065	93873	1100	94464	1200	79025	1300	73193	1400	68216
1066	93782	1100	94379	1200	78960	1300	73136	1400	68167
1067	93691	1100	94294	1200	78895	1300	73079	1400	68118
1068	93600	1100	94209	1200	78830	1300	73022	1400	68069
1069	93509	1100	94124	1200	78765	1300	72965	1400	68020
1070	93418	1100	94039	1200	78700	1300	72908	1400	67971
1071	93327	1100	93954	1200	78635	1300	72851	1400	67922
1072	93236	1100	93869	1200	78570	1300	72794	1400	67873
1073	93145	1100	93784	1200	78505	1300	72737	1400	67824
1074	93054	1100	93699	1200	78440	1300	72680	1400	67775
1075	92963	1100	93614	1200	78375	1300	72623	1400	67726
1076	92872	1100	93529	1200	78310	1300	72566	1400	67677
1077	92781	1100	93444	1200	78245	1300	72509	1400	67628
1078	92690	1100	93359	1200	78180	1300	72452	1400	67579
1079	92600	1100	93274	1200	78115	1300	72395	1400	67530
1080	92509	1100	93189	1200	78050	1300	72338	1400	67481
1081	92418	1100	93104	1200	77985	1300	72281	1400	67432
1082	92327	1100	93019	1200	77920	1300	72224	1400	67383
1083	92236	1100	92934	1200	77855	1300	72167	1400	67334
1084	92145	1100	92849	1200	77790	1300	72110	1400	67285
1085	92054	1100	92764	1200	77725	1300	72053	1400	67236
1086	91963	1100	92679	1200	77660	1300	71996	1400	67187
1087	91872	1100	92594	1200	77595	1300	71939	1400	67138
1088	91781	1100	92509	1200	77530	1300	71882	1400	67089
1089	91690	1100	92424	1200	77465	1300	71825	1400	67040
1090	91600	1100	92339	1200	77400	1300	71768	1400	66991
1091	91509	1100	92254	1200	77335	1300	71711	1400	66942
1092	91418	1100	92169	1200	77270	1300	71654	1400	66893
1093	91327	1100	92084	1200	77205	1300	71597	1400	66844
1094	91236	1100	91999	1200	77140	1300	71540	1400	66795
1095	91145	1100	91914	1200	77075	1300	71483	1400	66746
1096	91054	1100	91829	1200	77010	1300	71426	1400	66697
1097	90963	1100	91744	1200	76945	1300	71369	1400	66648
1098	90872	1100	91659	1200	76880	1300	71312	1400	66600
1099	90781	1100	91574	1200	76815	1300	71255	1400	66551
1100	90690	1100	91489	1200	76750	1300	71198	1400	66502
1101	90600	1100	91404	1200	76685	1300	71141	1400	66453
1102	90509	1100	91319	1200	76620	1300	71084	1400	66404
1103	90418	1100	91234	1200	76555	1300	71027	1400	66355
1104	90327	1100	91149	1200	76490	1300	70970	1400	66306
1105	90236	1100	91064	1200	76425	1300	70913	1400	66257
1106	90145	1100	90979	1200	76360	1300	70856	1400	66208
1107	90054	1100	90894	1200	76295	1300	70799	1400	66159
1108	89963	1100	90809	1200	76230	1300	70742	1400	66110
1109	89872	1100	90724	1200	76165	1300	70685	1400	66061
1110	89781	1100	90639	1200	76100	1300	70628	1400	66012
1111	89690	1100	90554	1200	76035	1300	70571	1400	65963
1112	89600	1100	90469	1200	75970	1300	70514	1400	65914
1113	89509	1100	90384	1200	75905	1300	70457	1400	65865
1114	89418	1100	90299	1200	75840	1300	70400	1400	65816
1115	89327	1100	90214	1200	75775	1300	70343	1400	65767
1116	89236	1100	90129	1200	75710	1300	70286	1400	65718
1117	89145	1100	90044	1200	75645	1300	70229	1400	65669
1118	89054	1100	89959	1200	75580	1300	70172	1400	65620
1119	88963	1100	89874	1200	75515	1300	70115	1400	65571
1120	88872	1100	89789	1200	75450	1300	70058	1400	65522
1121	88781	1100	89704	1200					

